Roy F. Weston, Inc.
Suite 500
750 East Bunker Court
Vernon Hills, IL 60061-1450
847-918-4000 • Fax 847-918-4055
www.rfweston.com

28 January 2002

Mr. Steve Faryan
On-scene Coordinator
United States Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

TDD: 0105-004
Document Control No.:103-3A-ABFM

Re: Review Comments on the Removal Action Work Plan
The Lockformer Company, Lisle, Illinois

Dear Mr. Faryan:

Roy F. Weston, Inc. (WESTON®), is pleased to submit the review comments on the Removal Action Work Plan (RAWP) for the above-referenced site prepared by Clayton Group Services, of Downer Grove, Illinois. The groundwater-related sections in the RAWP were not reviewed at this time as the review was focused for the soil (source removal) portion of the RAWP. The review comments for the document, provided below, are grouped into general comments and specific comments.

GENERAL COMMENTS

The selection of technology to treat the upper till by electric resistive heating (ERH) and the mass waste unit by soil vapor extraction (SVE) appears to be appropriate; however, selection of SVE to treat the degreaser pit area is questionable due to presence of clayey soil under degreaser pit area. Therefore, a pilot test is recommended to see if the SVE will be effective for soils associated with the degreaser pit area. In addition, a dual-phase SVE system was proposed for the mass waste unit in the previously submitted RAWP. The current RAWP has dropped the dual phase SVE system and has suggested to use the SVE system. It is recommended that a dual-phase system be implemented for remediation of the mass waste unit.

The upper portion of the lower till has significant level of contamination and no remediation plan for treating the upper portion of the lower till has been presented. The treatment of upper portion of the lower till should be performed under this removal action. A treatment technology should be selected for treatment of the upper portion of the lower till. In addition, a removal action cleanup level(s) for the lower till has not been addressed in the RAWP. Since the cleanup level for the

overlying burden (mass waste unit) is 0.06 mg/kg and due to the proximity of the lower till to groundwater, the cleanup standard for the lower till is recommend to be 0.06 mg/kg (which is based on migration to groundwater).

During treatment by ERH, trichloroethene (TCE) could breakdown to cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride. If analytical results of confirmation samples show occurrence of TCE breakdown compounds at levels greater than the historically reported levels, the treatment system will be operated until the soil concentrations are reduced below the historical levels.

Further investigation is planned to appropriately determine the area requiring remediation within Areas 1, 2, and 3. To facilitate implementation of the removal action within Areas 1 and 2 as soon as possible, WESTON recommends investigation of Areas 1 and 2 prior to Area 3.

Recommended locations for additional investigation have been marked on the figures provided in Attachment A. These areas should also be investigated, beginning with Areas 1 and 2.

Fill material was placed on Areas 2 and 3 and the historical drainage areas that are potentially contaminated are covered with this fill material. The thickness of the fill material should be determined using historical topographic maps and aerial photographs prior to any sampling associated with investigation of the historical drainage features.

There is no plan for confirmatory sampling for the degreaser pit area. A confirmatory sampling plan for the degreaser pit area should be included.

Final confirmatory sampling in the Areas 1 and 2 should be done only after the soil temperature has reached the baseline soil temperature. Therefore, a baseline soil temperature should be established prior to start of the ERH system.

The RAWP suggests to place the drill cuttings in the remediation area and for treatment. WESTON recommends that the drill cuttings be appropriately disposed off-site.

The SVE wells and the fence will be metallic; therefore, they should be constructed such that there is not electric conductance in these units. WESTON further recommends that the entire site be fenced to restrict trespasser access.

A Construction Quality Assurance Project Plan and Construction Quality Control Plan for the construction is not planned. To prevent delays in initiation of the removal action, WESTON

recommends that substantive requirements of these plans be included in the RAWP in lieu of preparing separate plans.

The Quality Assurance Project Plan (QAPP) included in the RAWP requires revision to ensure that the substantive requirements for the QAPP have been met. The QAPP guidance can be obtained from the On-scene Coordinator (OSC).

The air-monitoring plan for the project should be more aggressive due to the presence of a residential/commercial neighborhood surrounding the site. The ambient air inside the building should be rigorously monitored to ensure that the workers are not exposed to the toxic fumes from the treatment of soil.

A contingency plan has not been prepared and is necessary. Substantive requirements for the contingency plan should be included in the RAWP.

The basis of several design and operational parameters is unclear (such as determination of breakthrough in the carbon units and the point at which te SVE system will be run on pulsed versus continuous operation). WESTON has requested additional information for numerous design and operational parameters within the specific comments below.

No design plans or specifications have been prepared for this project; therefore, they have not been reviewed.

SPECIFIC COMMENTS

SECTION 1 (BACKGROUND)

Subsection 1.1 (Introduction), Page 1-1

1. The scope of this work plan is to address remedial activities that will be performed in order to meet the removal action objectives set forth in the Unilateral Administrative Order (UAO) that is being enforced by the U.S. EPA Emergency Response Branch. To clarify this, the following insert should be included as the first paragraph of Subsection 1.1:

   > "The scope of this work plan is to address the removal action that will be performed in order to meet the requirements set forth in the UAO that is being enforced by the U.S. EPA Emergency Response Branch. This LWP focuses on remediation of trichloroethene (TCE) in soil, which is considered

to be a primary constituent of concern (COC) at the site; however, other volatile organic compounds (VOCs) have been detected at the site. Since the current remediation goals are designed to achieve requirements set forth by the U.S. EPA Emergency Response Branch, future remediation of soil and other environmental media may be required under other federal and/or state-lead remedial programs to address constituents and contaminant exposure pathways that are not addressed under the scope of this LWP."

Subsection 1.2 (Objective), Page 1-2

1. The first bullet under the objectives should read:

   "Perform soil investigations in Areas 1 and 2 to determine the extent of removal action required."

2. Change "The objectives of this LWP are as follows:" to read:

   "In order to meet the requirements of the UAO enforced by U.S. EPA Emergency Response Branch, the objectives of this LWP are as follow:"

3. Removal activities within Areas 1 and 2 should focus on three soil units: the upper (surficial) clay till/fill unit; the "mass waste" unit underlying the surficial clay till/fill layer; and the upper portion of the lower clay/silt unit underlying the mass waste unit. Although the typical depths of the surface clay till/fill and mass waste units may be similar to those presented in bullet 1, removal activities should address geologic units rather than depth intervals that are likely only representative of these units in certain locations. To clarify the scope of removal action within Areas 1 and 2, bullet 1 should read:

   "To present the method by which the upper clay till/fill, mass waste, and lower clay units will be remediated in Areas 1 and 2. The remedial approach for Area 3 will be determined upon completion of investigation of Area 3."

4. After bullet 4, insert the following sentence:

   "Future soil remediation may be required to address the remaining contamination under other federal and/or state-lead remedial programs."

Subsection 1.3.1 (Topography), Page 1-3

1. Figure 1.3-3: This figure should be updated to indicate the retention basin located south of the Lockformer building.

2. Fourth line of paragraph 1: Insert the following text after "both parcels slope to the south/southwest.":

   > "The topography of Areas 2 and 3 was altered by placement of approximately 8 to 16 feet (ft) of fill material generated during construction along Ogden Avenue. Fill material depth is typically deepest along the western portion of Area 2 and apparently pinches out in Area 3. In addition, the site topography was also altered by placement of fill material in Area 1 south of the Lockformer building."

   Provide a historical topographical map of the site in the document that shows the site conditions prior to placement of the fill material. This map will aid in determining the depth where sampling is planned along the historical drainage ways (discussed in Subsection 4.4 and indicated on Figure 4.4-1). Upon evaluation of the former site topography, which is likely as represented in the site location map (Figure 1.3-1), the above insert may require revision to include a brief discussion of the historical topography of the site.

3. Page 1-4: A discussion of the historical drainage features of the site should be included as the last paragraph in the subsection. The discussion should include locations of and flow directions within the historical drainage features depicted on Figure 4.4-1.

Subsection 1.3.3 (Hydrogeology), Page 1-7

1. Potentiometric surface maps should be included in the report. The potentiometric surface maps should be prepared based on the most recently measured groundwater elevations within the monitoring wells screened in the mass waste unit and based on the monitoring wells screened in the bedrock. A discussion of the maps should also be included in this subsection.

Figures 1.3-5, -6, and -7

1. Use of hatching on the various lithographic units would allow for easier understanding of the site geology.

SECTION 2 (DATA SUMMARY)

Figures 2.1-5G and -5H

1. The extent of contamination (TCE > 0.06 mg/kg) associated with the numerous samples collected from unsaturated soil from the 40+ ft below ground surface (bgs) interval is not depicted on the figures (see table below under comment 3).

2. The boring log for CSB-1202 and page 2 of Table 2.1-4 do not indicate the sample collected from CSB-1202 at 45 to 47 ft bgs. Instead, the sample was reported collected from 48-50 ft bgs in the table and the boring log. Correct the information as appropriate.

3. The following samples were collected from unsaturated conditions and should be addressed under the scope of the removal action within the LWP (as further justified in the comments for Section 3):

Sampling Location	Depth Interval, ft bgs	TCE Concentration, mg/kg	Sample Media Type
SB-805	46 – 48	22	Mass Waste/Lower Clay interface
MW-522	48 – 50	0.81	Mass Waste
SB-807	48 – 50	51	Mass Waste/Lower Clay interface
CSB-1210	42 – 44	0.816	Mass Waste
CSB-1204	42 – 44	1.1	Mass Waste
SB-602	45 – 47	13	Mass Waste/Lower Clay interface
CSB-1205	44 – 46	0.634	Mass Waste/Lower Clay interface
CSB-1205	46 - 48	0.624	Lower Clay
CSB-1206	44 - 46	6.24	Mass Waste
SB-801	45 - 47	8.2	Mass Waste
CSB-1207	44 - 46	20.1	Mass Waste
CSB-1207	50 - 52	0.115	Lower Clay Surface
SB-605	43 - 45	7.8	Mass Waste
CSB-1200	46 - 48	50.9	Mass Waste
CSB-1200	48 - 50	2.14	Mass Waste/Lower Clay interface
MW-1108S	46 - 48	34.9	Mass Waste/Lower Clay interface
CSB-1202	45 - 47	0.79	Mass Waste/Lower Clay interface
CSB-1202	56 - 58	0.472	Lower Clay
CSB-1208	44 - 46	0.911	Mass Waste/Lower Clay interface
MW-104	42 - 44	1.1	Mass Waste (Bedrock at 44.5ft)
CSB-1209	40 - 42	0.118	Mass Waste
SB-608	42 - 44	0.15	Lower Clay Surface
CSB-1201	52 - 54	42.3	Mass Waste/Lower Clay interface

Figure 2.2-1

1. The concentration units indicated on Figure 2.2-1 are mg/kg; however, Table 2.2-1 units are in micrograms per kilogram (ug/kg). Please revise as appropriate. In addition, significant deviation is noted between samples analyzed using field gas chromatography (GC) and those that were laboratory-analyzed. Although the field GC results seems to be conservative based on the values presented, the quality of both the laboratory and field GC data are questionable due to such high differences in the data.

   For boring CSB-1558, the boring log indicates a sample was collected for VOC analysis from 2 to 4 ft bgs; however, the sample results have not been provided on Figure 2.2-1 nor in Table 2.2-1. In addition, Figure and Table 2.2-1 indicate a sample collected from 22 to 24 ft bgs; however, the boring log indicates the sample was collected from 20 to 22 ft bgs. Please revise as appropriate.

SECTION 3 (REMEDIAL OBJECTIVES)

1. General: The subsection title should be changed to "Removal Action Objectives."

2. Page 3-1: Replace last two sentences of first paragraph with the following insert:

   > "The removal action objectives (RAOs) presented within this section are in accordance with the UAO and are based on cleanup standards negotiated with the U.S. EPA Removal Section for the TCE source removal activities addressed by this LWP. Additional RAOs may be developed in the future based on requirements of other federal and/or state remedial programs."

   During treatment by ERH, TCE could breakdown to cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride. If analytical results of confirmation samples show occurrence of TCE breakdown compounds at levels greater than the historically reported levels, the treatment system will be operated until the soil concentrations are reduced below the historical levels.

Subsection 3.1 (Surficial Silty Clay Glacial Till and Fill), Page 3-1

1. Fourth line of first paragraph: Add "Tier 1" following "(TACO)."

2. Insert as last paragraph in subsection:

> "The RAO for surficial clay till/fill in Area 3 is 0.06 mg/kg, which is based on the IEPA TACO Tier 1 remediation objective for the Soil Component of the Groundwater Ingestion Exposure Route for Class I groundwater."

Subsection 3.2 (Mass Waste Sand and Gravel), Page 3-1

1. Third line of first paragraph: Add "Tier 1" following "TACO."

2. General: TCE is present at concentrations exceeding the TACO Tier 1 Remedial Objective for the Soil Component of the Groundwater Ingestion pathway at numerous locations in the lower clay/silt unit (underlying the mass waste unit). TCE distribution within the lower clay/silt unit appears to be such that concentrations are significantly higher near the interface between the mass waste and lower clay/silt units than in the central and lower portions of the lower clay/silt unit.

   Based on discussions and past Clayton submittals, WESTON understands that Clayton's interpretation of the site hydrogeology is that precipitation infiltrates vertically through the upper clay till/fill and mass waste units until it reaches the lower clay/silt unit, which serves as an aquitard thereby creating perched water conditions and lateral migration of groundwater. Although the lower clay/silt unit is reported to have relatively low permeability (thereby limiting the TCE migration potential), the elevated TCE concentrations (up to 51 mg/kg) present in the lower clay unit near the interface of the mass waste and lower clay units presents an imminent threat to groundwater. Consequently, WESTON believes that the removal action goal for the upper portion of the lower clay/silt unit should be 0.06 mg/kg. Further remediation of the lower clay unit (i.e., central and lower portions) may be required under other federal and/or state remedial programs. The RAWP should be revised to include removal action objective(s) and activities associated with the upper portion of the lower clay/silt unit.

3. This subsection does not present RAOs for Area 3. Since the highly permeable mass waste unit is considerably closer to the ground surface or exposed in Area 3, this subsection should be revised to indicate that the RAO for soil in Area 3 is 0.06 mg/kg.

SECTION 4.0 (FIELD SAMPLING PLAN)

1. General: The FSP for this project indicates that soil borings will be performed using direct

push technology. This boring and sampling technique is not addressed in any of the provided SOPs. An SOP should be prepared to detail the methods and procedures whereby soil borings will be advanced and soil and groundwater samples may be collected using direct push equipment. Then reference these new SOPs in the sampling plan.

The FSP indicates that Method 5035 will be utilized for soil sampling; however, it is unclear whether Encore samplers will be utilized or field methanol preservation will be performed. In either case, the SOPs do not adequately address these sampling protocols.

Appendix B is referenced throughout the sampling plan as containing the Standard Operating Procedures (SOPs); however, the SOPs are included as Appendix A. The document needs to be updated for this change.

2. First paragraph: Replace "Order" with "UAO."

3. Page 4-1, paragraph following bullet 4: The extent of TCE exceeding the 0.06 mg/kg standard within the mass waste and upper portion of the lower clay unit in Areas 1 and 2 is not completely defined. Prior to remediation of the mass waste unit and upper portion of the lower clay unit, additional investigation should be performed. Replace "remediation by Electrical Resistive Heating (ERH)" with "removal action under the scope of this LWP."

Subsection 4.1 (Additional Soil Sampling in Area 1), Page 4-2

1. Replace the second sentence of first paragraph with the following:

> "Additional soil sampling will be conducted in Area 1 to define the extent of TCE concentrations within the surficial clay till/fill unit, mass waste unit, and the upper portion of the lower clay/silt unit that exceed the RAOs described in Section 3.0."

Subsection 4.1.1 (Area 1 Soil Borings), Page 4-2

1. Change subsection heading to read: "Area 1 Soil Borings in Surficial Clay Till/Fill."

2. First line of first paragraph: Insert after "Soil boring locations" the following:

> "to delineate the extent of TCE within the surficial clay till/fill exceeding a concentration of 8.9 mg/kg"

3. Second paragraph:

   a. Previous borings advanced at the site using a direct-push technology have frequently terminated at approximately 16 ft bgs. In order to facilitate investigation of the entire depth of the surficial clay till (which typically extends to depths of 30 ft bgs), a heavy-duty direct-push rig will be required. If the heavy-duty direct-push rig cannot advance borings to the upper surface of the mass waste unit, a hollow-stem auger (HSA) technology should be used to complete the investigation. To prevent delays to the overall project schedule associated with drilling contractor arrangements, Clayton should consider using a HSA rig for the entire investigation.

      To clarify the completion depth for borings in the surficial clay till/fill, WESTON recommends replacing "to the boring completion depth." in the fourth line to state "to the upper surface of the mass waste unit."

   b. Fifth line: Replace "a portion of each sample" with "the portion of each 4-ft core recovered that exhibits the most visual or olfactory evidence of contamination."

   c. 10^{th} and 11^{th} lines: It will be difficult to track in the field where samples should be collected if one sample is to be collected every 10 ft when using 4-ft long cores. Consequently, WESTON recommends changing "10-foot" to "8-foot."

      NOTE: If a HSA/split-spoon sampler technique is implemented for the investigation, WESTON believes that one sample per 10 ft would be an appropriate frequency.

   d. 11^{th} / 12^{th} lines: Add "for VOCs" following "will be selected for laboratory analysis."

4. General

   a. The sampling plan for the investigation of the surficial clay till/fill unit is based on arbitrarily drawn contours that represent the extent of soil containing TCE at concentrations above 8.9 mg/kg. The contour for the extent of contamination in Area 1 extends under the western portion of the building; however, there is no analytical data in this area to justify that TCE concentration indeed exceed 8.9 mg/kg under the building. Ease of implementation for the ERH technology could be greatly improved if electrodes are unnecessary under the western portion of the building.

      Based on this rationale, WESTON recommends advancing three borings along the

southwestern portion of the building interior (see attached **Figure 2.1-1 in Attachment A**) to verify that TCE concentrations exceed 8.9 mg/kg in this area. Based on a review of existing TCE distribution data and site geology, these borings should be advanced to a minimum depth of 20 ft bgs, under the same protocols used for the borings located outside of the building (e.g., one sample every 8 ft if using direct-push technique). A figure indicating the location of the additional borings, including unique identifiers for each of the proposed soil borings, should be prepared.

b. Additional sampling of the mass waste unit and upper portion of the lower clay unit is required to define the extent of contamination. WESTON recommends advancing additional borings as indicated on **Figure 2.1-5F of Attachment A** to confirm the extent of contamination. Sampling of the borings should be similar to the protocols (i.e, sampling frequency, etc.) for sampling of the surficial clay till/fill in the proposed ERH areas. Samples should be collected from the zone extending from the upper surface of the mass waste unit into the upper portion of the lower clay/silt unit. In lieu of drilling inside the building, horizontal drilling may help in achieving target depths under the Lockformer building. WESTON recommends that this sampling be described in a new subsection. In addition, a sampling location map should be prepared, including unique identifiers for each of the proposed soil borings.

c. Significant data gaps exist associated with the soil underlying the degreaser pit area. In borings CSB-1319 and CSB-1325 the interval ranging from 4 to 14 ft bgs is uncharacterized, and in borings CSB-1316, CSB-1317, and CSB-1320 the interval ranging from 6 to 14 ft bgs is uncharacterized. Analytical results of borings CSB-1315 and CSB-1318 indicate there is potential for TCE migration within the upper soil unit underlying the building. Consequently, remedial effort in the degreaser pit area should address soil to a depth of approximately 14 ft bgs unless the vertical extent of soil containing >8.9 mg/kg TCE is defined through additional sampling.

   The lateral and vertical extent of soil containing TCE at concentrations exceeding 8.9 mg/kg is not completely defined west of boring CSB-1325 and to the southeast, south, and southwest of boring CSB-1315. Based on this, WESTON recommends advancing an additional 4 borings in the vicinity of the degreaser pit to confirm the extent of contamination. Recommended locations for these borings are indicated on **Figure 2.2-1 of Attachment A**. Samples should be collected for VOC analysis every 4 ft to a minimum depth of 16 ft bgs. A figure indicating the location of the additional borings, including unique identifiers for each of the proposed soil borings, should be prepared.

At least two soil samples must be collected under the degreaser pit.

d. Due to evidence of historical fill placement in the southern portion of Area 1, three borings should be advanced along the southern boundary of Area 1 (as indicated in Figure 4.4-1 of Attachment A). These borings should be advanced into the upper portion of the lower clay/silt unit (unless groundwater is encountered prior). The easternmost boring should be advanced to bedrock to define geology in this area. Sampling of these borings should parallel sampling of the upper clay till/fill and mass waste units to define areas requiring treatment via ERH and SVE, respectively (e.g., one sample per 8 ft if using direct-push technique).

e. Figure 4.1-1: The proposed borings should be labeled with unique identifiers. It is WESTON's understanding that the additional borings will be advanced outside of the existing grid pattern if TCE is identified at any of the peripheral boring locations (i.e., if the borings along the westernmost transect in Area 2 contain TCE at concentrations exceeding 8.9 mg/kg, additional samples will be collected north, south, and west of the existing transect). Please confirm that this is the intent.

Subsection 4.2 (Additional Soil Sampling in Area 2), Page 4-3

1. Replace the second sentence of first paragraph with the following:

   "Additional soil sampling will be conducted in Area 2 to define the extent of TCE concentrations within the surficial clay till/fill unit, mass waste unit, and the upper portion of the lower clay/silt unit that exceed the RAOs described in Section 3.0."

Subsection 4.2.1 (Area 2 Soil Borings), Page 4-3

1. Change subsection heading to read "Area 2 Soil Borings in Surficial Clay Till/Fill."

2. General: Additional sampling of the mass waste unit and upper portion of the lower clay unit is required to define the extent of contamination. WESTON recommends advancing additional borings as indicated on **Figure 2.1-5F of Attachment A** to confirm the extent of contamination. Sampling of the borings should be similar to the protocols (i.e, frequency, etc.) for sampling of the surficial clay till/fill in the proposed ERH areas. Samples should be collected from the zone extending from the upper surface of the mass waste unit into the upper portion of the lower clay/silt unit. WESTON recommends that this sampling be

described in a new subsection. In addition, a sampling location map should be prepared, including unique identifiers for each of the proposed soil borings.

Subsection 4.3 (Additional Soil and Groundwater Investigations in Area 3), Page 4-3

1. Revise second sentence of first paragraph to read:

   "Investigations to date indicate that there may be VOC contamination associated with the sewer systems that run along the eastern and southern portions of Area 3."

2. Paragraph 1, lines 4 and 5: Replace "along the sanitary sewer line extending west" with "in Area 3."

Subsection 4.3.1 (Area 3 Soil Borings), Page 4-4

1. Although the first sentence of the first paragraph indicates that sampling will occur to the east of the Lockformer facility, Figure 4.3-1 does not indicate sampling locations east of the facility. Figure 4.3-1 should be revised to include the proposed boring locations east of the facility and should also include unique location identifiers for all proposed borings and wells.

2. The FSP indicates that borings will be advanced using a direct-push technique; however, previous borings advanced in this area using direct-push technology failed to encounter saturated conditions in many borings. In addition, the vertical extent of contamination in many of these borings (CSB-1529, CSB-1558, CSB-1561, CSB-1562, CSB-1565, CSB-1568, and CSB-1572) was not determined. The vertical extent of contamination should be defined in these areas (except at CSB-1529, which appears to have been adequately delineated). Otherwise, it should be assumed that contamination extends to the groundwater elevation at approximately 30 ft bgs.

3. Since significant discrepancy between field GC and analytical laboratory results were observed during previous investigation along the sewer line, WESTON recommends use of a certified analytical laboratory in lieu of a field GC for this investigation.

4. Lateral migration of TCE may have occurred within the southern portion of Area 3. WESTON recommends collection of additional samples north and south of the existing line of borings to confirm that lateral migration has not occurred. Recommended boring locations are indicated on **Figure 4.3-1 of Attachment A**. The traverse of borings north of the sanitary

sewer line would be advanced along or near the storm sewer, and the southern traverse of borings should be located between the railway and the creek. At least two of the southern borings should be advanced to bedrock to define the site geology and aid in evaluating contaminant migration and the effect of St. Joseph Creek on the site hydrogeology.

5. It is Clayton's assumption that the TCE contamination associated with the borings advanced along the sewer lines in Area 3 originated from the sewers. The hotspot at CSB-1529/1572 is apparently downgradient of the catch basin/manway near CSB-1315. Since the contamination at the CSB-1529/1572 hotspot (which is located from approximately 14 to 22 ft bgs) may have originated from the connections at this manway, WESTON recommends completing boring CSB-1528 to a minimum depth of 22 ft bgs.

6. The second paragraph, which describes groundwater sampling, was not reviewed.

Subsections 4.3.2 and 4.3.3

These subsections were not reviewed.

Subsection 4.4 (Additional Surficial Drainage Way Sampling), Page 4-6

1. The southwest portion of Area 2 has not been adequately characterized. An additional boring should be advanced along the western drainage feature to determine if TCE had historically migrated from the Lockformer building area. The recommended boring location would be approximately midpoint between MW-1105D and MW-521. The boring should be advanced into the upper portion of the lower clay/silt unit or until groundwater is encountered. Samples should be collected every 8 ft (direct push) or 10 ft (HSA/split-spoon sampler).

2. Historically, a settling basin was present in the central portion of Area 3 (see Figure 4.4-1). The surface water drainage way sampling should include investigation of this area since it may have served as a sink for TCE released at the site. Recommended boring locations are based on a grid with traverses spaced at 50 ft, as indicated on the **attached Figure 4.4-1 in Attachment A**. Prior to the investigation, an evaluation to estimate the depth of fill placed in this area and to determine the historical elevation of the settling basin should be performed based on historical topographical maps. Since the mass waste unit may have historically been the surface soil in this area, thereby facilitating rapid vertical migration of contaminants, all borings should be advanced into the upper portion of the lower clay/silt unit.

3. In general, a 16-ft boring depth seems appropriate for borings located in Area 1 and offsite to the east, provided the vertical extent of contamination (if present) is delineated. Due to placement of fill on Areas 2 and 3, an evaluation of historical topographical maps to current site conditions should be performed to verify that a 16-ft boring depth is appropriate for the borings proposed in Areas 2 and 3.

4. Figure 4.4-1: All proposed borings should be labeled using unique identifiers.

4.5.5 Sample Identification System Examples

1. Please provide an example identifier for duplicate samples.

Subsection 4.8.2 (Management of Investigation-Derived Soils), Page 4-25

1. All investigative-derived wastes, including soil cuttings, should be managed in accordance with U.S. EPA guidance document for investigation-derived waste.

Figure 4.6-1

This figure was not reviewed.

Subsection 4.9

1. General: This QAPP should follow the Region V Guidance for preparing the QAPP. The QAPP guidance should be obtained from the OSC and revised as necessary.

   WESTON recommends that a U.S. EPA submit a performance evaluation sample to the Lockformer-selected laboratory to check the laboratory capabilities. A laboratory audit is also recommended.

SECTION 5.0 (REMEDIAL TECHNOLOGY IMPLEMENATTION)

1. Page 5-1: Insert as first sentences of section:

   > "This section describes remedial technologies that will be used in Areas 1 and 2 of the site. A remedial approach and design will be developed for Area 3 of the site upon completion of investigation activities."

2. General: Due to the clayey soil present as well as the presence of structural fill material, WESTON believes that the proposed SVE will be least effective compared to other available technologies (i.e., excavation, ERH, etc.) for soil remediation in the degreaser pit area.

Subsection 5.1 (Electrical Resistive Heating)

1. Page 5-1, lines 3/4 of paragraph 1: As previously stated, the removal action should focus on specific geologic units rather than depth intervals that may not be representative of the locations of these units in all areas of the site. Based on this approach, "to a depth of 30 feet" should be replaced with "to remediate the surficial clay till/fill unit in Areas 1 and 2." Although a 30 ft depth appears to be appropriate based on a review of the boring logs within the contamination contours depicted on Figure 4.1-1, the depth for the electrode installation should be based on results of the proposed investigation of the surficial clay till/fill unit for these areas (as described in Subsections 4.1.1 and 4.2.1).

2. Page 5-1 and 5-2, paragraph 2, sentence 2: During implementation of ERH, the TCE in the soil will become highly mobile since it is in the vapor phase at elevated temperatures. To ensure that lateral migration of TCE outside of the area of influence of the ERH's SVE system has not occurred during remediation, the confirmation sampling program for the surficial clay till/fill unit should also include borings beyond the perimeter of the zone of influence of ERH's SVE system.

   During treatment by ERH, TCE could breakdown to cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride. If analytical results of confirmation samples show occurrence of TCE breakdown compounds at levels greater than the historically reported levels, the treatment system will be operated until the soil concentrations are reduced below the historical levels.

Subsection 5.1.1 (Electrical Resistive Heating Process)

1. Page 5-3, first paragraph: Please provide documentation that the treatment interval using ERH extends 3 ft above and below the conductive depth interval of the electrodes. If documentation cannot be provided, electrodes should be installed such that the conductive depth interval includes the entire surficial clay fill/till unit to ensure effective treatment occurs in the upper and lower zones of the surficial clay till/fill.

2. Page 5-4, first bullet: How the "99% decrease at ambient temperatures" and 1 mg/L values were derived?

3. Page5-4, paragraph following first bullet on page: Post-remedial sampling should occur once the soil temperatures in Areas 1 and 2 return to their baseline conditions to account for potential TCE and/or TCE breakdown products concentration rebound due to condensation of TCE vapor remaining in the soil matrix.

Subsection 5.1.2 (Performance and Reliability of Technology)

1. Page 5-5, first bullet: Although the process described may be valid, has it been established that anaerobic dechlorination is occurring at the site?

2. Page 5-5, third bullet: Please provide documentation that rebound has not occurred at any ERH site.

3. Page 5-5, fifth and sixth bullets: Please provide documentation that chlorinated VOC biodegradation by thermophilic bacteria is enhanced by ERH use.

4. pp 5-5, eighth bullet: Please provide documentation that hydrous pyrolysis rates are enhanced by using ERH.

Subsection 5.1.3 (Feasibility of Implementation)

1. First paragraph of subsection: What other technologies were evaluated?

2. Second paragraph of subsection: Please provide documentation that ERH has been accepted as the best available technology for *in situ* remediation of VOCs in soil and groundwater.

3. Third paragraph in subsection: Describe vinyl chloride formation at the AT&T site. Was a "No Further Remediation" letter obtained for the Lucent site?

4. General: This subsection indicates that ERH has been successfully implemented at sites in Illinois and that Clayton has worked on; however, none of the issues associated with implementability are discussed, nor are the corresponding actions that could be undertaken to overcome issues associated with implementability.

Subsection 5.1.4 (Design and Technical Specifications)

1. Page 7, first paragraph: In Subsection 5.1, Clayton states that ERH will be implemented to a depth of 30 ft bgs, and in Subsection 5.1.1, Clayton states that soil is heated 3 ft above and

below the conductive interval. In the first paragraph of Subsection 5.1.4, Clayton states that the conductive interval will extend to 22.5 ft bgs in Area 1 and to 24 ft bgs in Area 2. Based on these depths, the lower zone of remediation will be 25.5 and 27 ft bgs in Areas 1 and 2, respectively (assuming a 3-ft zone of heating below the conductive interval is accurate). TCE was detected at 65.4 mg/kg in boring CSB-1201, and TCE concentrations detected in adjacent borings MW-1108S and MW-105 were 16.8 and 9.2 mg/kg (respectively), indicating that TCE concentrations likely exceed 8.9 mg/kg throughout the entire vertical profile of the surficial clay till/fill unit at this location. The electrode depths/conductive intervals should be such that the entire volume of soil containing TCE at concentrations exceeding 8.9 mg/kg within the surficial clay till/fill unit is heated in areas where ERH is implemented. The final electrode depths should be based on results of the proposed investigation of the surficial clay till/fill unit in Areas 1 and 2.

2. Page 5-8, first full paragraph: The condenser water will likely contain low levels of TCE; therefore, condenser water should not be reused for electrode wetting.

3. Page 5-8, third full paragraph: Define "TRS."

4. Page 5-8, last paragraph on page: Schematics should be provided indicating the design of a typical temperature monitoring probe (TMP). The proposed TMP locations do not appear to have adequate coverage of the treatment areas. WESTON recommends installation of additional probes at the locations indicated on **Figure 5.1-1 of Attachment A.** To determine if areas outside the designed vapor recovery area for the ERH system are being heated (thereby increasing for VOC migration), additional TMPs may require installation outside of the ERH remediation area.

5. Page 5-9, third paragraph: Monitoring thermocouples on a twice-a-week frequency is acceptable assuming the system is operating properly. More frequent monitoring may be required if system is not functioning as designed. Add also to the end of the paragraph the following insert:

   > "System operation/configuration will be modified if thermocouple temperatures indicate that target temperatures are not attained."

6. Page 5-9, fifth paragraph: Will the horizontal vapor recovery wells in Area 1 be placed on top of the asphalt or trenched into the underlying soil? Recovery may be ineffective if the vapor recovery wells are placed on top of the asphalt. Layout of the horizontal vapor recovery well system must be provided.

The zone of recovery for each vapor recovery well should equal approximately one-half the distance between the electrodes within the zone of remediation. Recovery wells may also be necessary along the perimeter of the remediation zone to capture any VOCs that may migrate laterally. In addition, WESTON recommends that vacuum monitoring points be installed between the electrodes to quantify the zone of vapor recovery.

Since there is a potential for contaminants to migrate laterally through the surficial clay till/fill unit, WESTON recommends that soil gas monitoring points be established outside the effective conductive zone of the electrodes to ensure that VOCs are not migrating in vapor phase outside the capture zone of the vapor recovery wells. Baseline conditions (prior to implementation of ERH) will need to be established to ensure that vapor-phase VOC levels are not increased in areas outside the zone of recovery during the implementation of ERH. During remediation, the monitoring points should be checked on a regular basis using a PID supplemented with analytical sampling if conditions indicate potential migration of VOCs.

Due to the proximity of the building to the remedial zone in Area 1, WESTON recommends daily health and safety monitoring of the ambient air within the building to ensure that workers are not subjected to elevated VOC levels that may occur in the building during ERH.

If asphalt is used as the plenum in Area 1, the pavement should be checked for cracks and sealed to ensure VOCs do not escape. In addition, in other areas where plenums are used, the plenum should be anchored to ensure leakage does not occur around the edge of the cover. If more than one sheet of material is used for the plenum, the sheets should be appropriately welded together and tested. The plenum should be regularly inspected to ensure that holes do not form due to exposure to elevated temperatures or from abrasion of the tarp from movement caused by wind. Any such holes should be repaired upon identification.

7. Page 5-9, sixth paragraph: The first sentence of this paragraph indicates that electrodes will "terminate" at 10 ft bgs. Please verify that this reference means that the top of the conductive interval is located 10 ft bgs.

   Comments above relating to active/passive recovery system, pressure and soil gas monitoring, and plenum installation/monitoring are also applicable to ERH performed in Area 2.

8. Page 5-10, second full paragraph: A header-piping layout should be provided.

9. Page 5-10, third full paragraph: The entire area remediated by the ERH should be covered with a plenum to ensure that VOCs are not being emitted in the atmosphere without treatment.

10. Page 5-11, bullet at top of page: Please describe and provide a diagram indicating how surface runoff will be directed away from the treatment areas.

11. Page 5-12, first paragraph: How was the blower sized? Please provide rationale.

12. Page 5-12, first paragraph: Previously, Clayton has stated that condenser water would be used for electrode wetting; however, here it states that the water will be discharged to the sanitary sewer. WESTON recommends that all condenser water be routed to the sanitary sewer for disposal after appropriate pre-treatment.

13. Page 5-12, second paragraph: Please provide a description and supporting documentation on how "it is physically impossible for ERH current to flow to a distant energy sink."

14. Page 5-12, third paragraph: What wattage is anticipated to be supplied to the field during active ERH (excluding downtime, etc.)?

Subsection 5.1.5 (System Installation)

1. Page 5-13, first paragraph: All soil cuttings should be appropriately drummed and disposed off-site.

   Please describe the drilling approach that will be used to install borings along the sloped portion of the site near the Area 1/2 boundary. Will benching be required? If so, the soil removed should be characterized for disposal.

2. General: An overall site layout map should be provided. The map should show locations for all major features such as support zones, piping, wiring, blower(s), power supply, etc. In addition, figures or technical drawings indicating the plenum, piping, and wiring designs should be supplied.

   No discussion is provided regarding removal of the system, which should be properly abandoned such that subsurface conduits are not created.

3. Page 5-13, third and fourth paragraphs (Testing and Start-up): Due to the potential for migration of vapor-phase VOCs into the mass waste sand and gravel unit during implementation of ERH, WESTON recommends that the SVE system for the mass waste sand and gravel unit be installed and functional prior to initiating treatment of the surficial clay till/fill unit. During ERH treatment of the surficial clay till/fill unit and until soil temperatures in the surficial clay till/fill unit return to baseline conditions, the mass waste SVE system should be in operation to capture any vapor-phase VOCs migrating into the more permeable mass waste unit.

Subsection 5.1.6 (Time Frame to Achieve Remedial Objectives)

1. General: As stated in the above comment, during ERH treatment of the surficial clay till/fill unit and until soil temperatures in the surficial clay till/fill unit return to baseline conditions, the SVE system installed in the mass waste unit should be operating to capture any vapor-phase VOCs that migrate downward into the more permeable mass waste unit.

Subsection 5.1.8 (Construction QA/QC)

1. General: A Construction Quality Assurance Plan (CQAP) and Construction Quality Control Plan (CQCP) would typically be prepared for a remediation project of this magnitude. Since preparation of a CQAP and CQCP may cause delays in initiation of the removal action, the substantive requirements of the CQAP and CQCP should be incorporated into Subsection 5.1.8 in lieu of preparing separate plans.

Subsection 5.2 (Soil Vapor Extraction)

1. General: Clayton had previously proposed to install a dual-phase SVE system for the site; however, the system present in the LWP is not dual-phase. WESTON recommends that the SVE system installed be a dual-phase system. The relatively high concentrations of TCE near the interface of the mass waste unit and the lower clay/silt unit pose the most imminent threat to groundwater. Use of a dual phase system will allow for collection of impacted groundwater that contacts these contaminated soils. In addition, due to the high levels of TCE observed, it is possible that DNAPL is present at this interface. Use of a dual phase system may facilitate collection of DNAPL, if present.

   Based on a review of the boring logs, it appears that the soils surrounding the degreaser pit are predominantly clayey soils, in which SVE will be relatively ineffective. Due to the clayey soils present, WESTON recommends a pilot test for the soil in this area prior to

implementation of the remedy to verify that acceptable recovery will occur. Other factors that may detract from the effectiveness of SVE is the presence of structural fill associated with the building foundation and utilities and the uncertain depth of contamination in areas around the degreaser pit. If pilot tests indicate that SVE would be ineffective for this area, WESTON recommends investigation of a more appropriate technology (i.e., excavation, ERH, etc.) for remediation of the soils associated with the vapor degreaser area.

It is also unlikely that SVE will be effective in reducing TCE levels in the upper portion of the lower clay/silt unit. WESTON recommends evaluating an alternate technology for remediation of the upper portion of the lower clay/silt unit.

2. Page 5-17, fourth paragraph: In order to demonstrate completion of remediation, discrete samples should achieve the RAO of 0.06 mg/kg for TCE. Also, the TCE breakdown products should be monitored and evaluated. If certain areas do not meet the RAO, remediation in such localized areas may continue.

Subsection 5.2.2 (Feasibility of Implementation)

1. Page 5-19, second paragraph: The concentrations referenced range up to 51 mg/kg; however, this concentration occurred in the lower clay/silt unit (SB-807, 48 to 50 ft bgs), in which SVE will have limited effect.

Subsection 5.2.2.1 (Pilot Test)

1. Page 5-20, third paragraph: Please provide a discussion regarding the electric conductivity (or lack thereof) associated with the stainless-steel wells.

2. Page 5-22, second paragraph: Where will the vacuum applied to the test well be measured? WESTON recommends measuring the vacuum and flowrates at the both the test wellhead and the blower intake.

3. Page 5-22, third and fourth paragraphs: It is unclear what "relative organic vapor concentration" refers to. Please revise to better describe this parameter. How will organic vapor concentrations be measured?

Subsection 5.2.1.2 (Degreaser Area)

1. First sentence: Although existing data indicates that TCE is primarily located up to depths

0 to 6 ft bgs, numerous borings lack sufficient evidence to prove that TCE does not exceed 8.9 mg/kg in soil located up to approximately 14 ft bgs. If alternate sampling is not performed to show that TCE is less than 8.9 mg/kg in the soil located from approximately 6 to 14 ft bgs (as described in comment 4.c. regarding Subsection 4.1.1.), Clayton should assume the interval requires remediation under the scope of this LWP and the remedial system should be designed to treat soil located from 0 to 14 ft bgs in these areas.

2. Third/fourth sentences: Preferential flow paths likely exist in the clayey soil underlying the building in the degreaser pit area; however, over time, preferential flow paths may become sealed and new flow paths formed. In this process, contaminants may become trapped within the clayey soils underlying the building. In addition, other factors such as diffusion may influence contaminant distribution within the soil matrix. Although SVE may be effective in removal of VOCs from the existing preferential flow pathways, SVE would likely be ineffective in recovering VOCs from the former preferential flow paths that have been sealed or from within the clayey soil matrices.

Subsection 5.2.3 (Design and Technical Specifications)

1. Page 5-23, first paragraph of subsection (reference to Figure 5.2-4): Although the figure is a conceptual layout and is subject to revision based on the pilot test results, the figure should be revised to extend the southern header pipe west to MW-522, where TCE was detected at a concentration of 0.81 mg/kg in sand located at 48 to 50 ft bgs. Although sand in this interval is noted as being wet on the boring logs, based on Table 2.1-9 the depth to groundwater in the well typically ranges from approximately 50.5 to 53 ft below the top of casing, indicating that the interval in question is in the smear zone and should be remediated under the scope of the removal action.

2. Page 5-23, second paragraph of subsection: As stated previously, the effectiveness of SVE in remediating the clayey soils present in the degreaser pit is questionable. WESTON recommends that alternate technologies be evaluated for this area; however, if SVE is implemented, the following should be addressed:

    a. A pilot test should be performed to determine design parameters and equipment sizes required.

    b. The remedial system should be designed to treat soil extending from the lower foundation surface to the underlying soil zone that has been demonstrated (by sample collection) to contain TCE at concentrations below the cleanup standard of 8.9

mg/kg.

c. Regardless of the technology implemented to remediate soil associated with the degreaser pit area, additional sampling should be performed to determine the lateral extent of soil containing TCE at concentrations exceeding 8.9 mg/kg (as described in comment 4.c. regarding Subsection 4.1.1).

3. General: Pressure monitoring probes should be installed within the soil units that are remediated using SVE to ensure that the desired radii of influence are attained.

Subsection 5.2.4 (System Installation)

1. Page 5-30, first paragraph of subsection (Vapor and Horizontal Extraction Wells): Drill cuttings and other IDW should be appropriately disposed of off-site.

2. Page 5-31, second paragraph: Please describe and provide methodology regarding calculation of breakthrough based on data collected during startup of the system. It seems that this approach would only be appropriate if the air flowrate and contaminant concentrations are constant or continuously monitored over the course of remediation.

Subsection 5.2.5 (Operation and Maintenance)

1. First sentence of subsection: WESTON recommends that a specific minimum time be determined for continuous operation prior to pulsed operation of the system. As stated previously, WESTON recommends that the mass waste SVE system be operated during all ERH activities and until the soil temperatures return to their baseline conditions.

2. First sentence of subsection: TCE recovery is based on several parameters, such as the flowrates achieved at each wellhead, the TCE concentrations in the soil near each extraction well, the number of wells online, etc. It is possible that the aggregate TCE recovered may be less than 0.5 pounds per day (lb/day), yet wells installed in highly contaminated soils may still be producing significant levels of TCE. In addition, the system operation should not be adjusted to indicate recovery less than 0.5 lb/day, when actual recovery could be higher under designed operating conditions. Provide rationale used to determine that 0.5 pounds per day is an appropriate cut-off point for continuous operation of the SVE system.

3. Page 5-32, last sentence of first paragraph: Provide rationale for pulsed operation schedule. It is recommended that the pulsing operation for the SVE be performed such that the blower

operation is scaled down from 100% in stages (e.g., operate blower at 75%; after reviewing the data for 75% pulsation decide if the system can be pulsated at 50%; and after reviewing data from 50% pulsating see if system can be pulsated at 25%).

4. Page 5-32, second full paragraph: The Operation and Maintenance Manual should be submitted to U.S. EPA for review and comment.

Subsection 5.2.6 (Time Frame to Achieve Remedial Objectives)

1. Page 5-32, first paragraph of subsection, fourth sentence: "no significant mass recovery" should be quantified.

Subsection 5.2.8 (Construction QA/QC)

1. General: A CQAP and CQCP would typically be prepared for a remediation project of this magnitude. Since preparation of a CQAP and CQCP may cause delays in initiation of the removal action, the substantive requirements of the CQAP and CQCP should be incorporated into Subsection 5.2.8 in lieu of preparing separate plans.

Subsection 5.3 (Water Discharge Monitoring)

1. General: This section should identify whether discharge is batch or continuous. Monitoring and discharge of water should be in accordance with the wastewater treatment facility requirements. Due to the time frame associated with obtaining discharge permits, this process should be immediately initiated.

Subsection 5.4.1 (Remediation and Air Treatment Systems)

1. General: The air-monitoring plan for the project should be more aggressive due to the presence of a residential/commercial neighborhood surrounding the site. The ambient air inside the building should be rigorously monitored to ensure that the workers are not exposed to the toxic fumes from the treatment of soil.

Subsection 5.4.2 (Ambient Air Monitoring)

1. Fourth paragraph of subsection (reference to Figure 5.4-1): The southern air monitoring station should be relocated to an onsite location immediately south of the existing parking lot. Also, continuous monitoring at the stack and at the site perimeter should be considered.

2. General: As stated previously, due to the proximity of the remediation area to the Lockformer building and since certain treatment system components appear to be located within the Lockformer building, the ambient air monitoring program should be revised to include daily ambient air monitoring inside of the Lockformer building during treatment system operation.

Subsection 5.5 (Treatment System Installation Derived Wastes)

1. Page 5-38, last paragraph, fourth line: Insert "and water" following "treatment of the air emissions."

Subsection 5.5.2 (Water from Soil Moisture)

1. General: If a dual-phase SVE system is implemented as recommended, this subsection will require revision to account for perched water recovered from atop the lower clay/silt unit.

Subsection 5.5.3 (TCE Vapor Emissions)

1. First paragraph of subsection: What is the rationale used to determine that 1% of the mass of TCE in the process air will be emitted?

2. First paragraph of subsection: The meaning of this paragraph is unclear. One may construe that 100% of the TCE removed from the subsurface will be released to the atmosphere. Please revise and clarify.

Subsection 5.5.4 (Used Carbon)

1. First paragraph, third sentence: Due to the differences in operation of the treatment systems over the course of the removal action and the distribution of TCE in the soil, the TCE loading to the carbon units will vary over the course of the removal action. Please describe how carbon unit replacement over the course of the removal action will be determined.

Figure 5.1-1

1. Each electrode should be assigned a unique indicator.

2. Figure 5.1-1 or a supplemental figure should indicate the layout for the entire system, including plenum, surface runoff controls, location of power supply and blower, horizontal

recovery wells, piping and wiring networks, etc.

Figure 5.2-1

1. The test well and each pressure monitoring point should be assigned unique identifiers.

Figure 5.2-4

1. Each well should be assigned a unique identifier.

2. Figure 5.2-4 should be revised to include an additional extraction well on the west end of the southern header, to remediate soil associated with MW-522.

3. Pressure monitoring points (with unique identifiers) should be indicated.

Figure 5.2-7

1. Figure should be revised to reflect a dual-phase extraction system (i.e., sump, pump, liquid line, etc.).

2. Will inline condensate knockouts be placed along horizontal pipes or will all liquid be removed from the airstream via the condensation tanks? If knockouts will be used, they should be indicated on figure.

SECTION 6.0 (CONFIRMATION SAMPLING)

1. General: Replace all "RO" and "ROs" references with "RAO" and "RAOs," respectively.

2. Page 6-1, paragraph 2: Confirmation samples should also be collected from the upper portion of the lower clay/silt unit.

3. Page 6-1, paragraphs 3 and 4: More detail is required regarding number of samples per boring (i.e., one sample per 10 ft).

4. Page 6-1, paragraph 4 and page 6-2, second full paragraph: TCE concentrations in all discrete samples should achieve the RAOs, otherwise continued remediation should be performed for areas associated with samples containing TCE at levels exceeding the RAOs. Also, if an increase in TCE breakdown products is observed, soil remediation should continue until

levels of TCE breakdown products are similar to historically reported levels.

5. Page 6-2, last paragraph: Confirmation samples should be collected only after soil temperatures have returned to baseline conditions.

6. General: Since the sampling locations are conceptual at this point in time, a confirmation sampling plan should be submitted for U.S. EPA approval prior to shutdown of the soil remediation systems.

7. General: Samples indicated on Figure 6.0-1 focus on soil within the treatment zone. Confirmation samples for all soil units should also include samples collected outside and/or along the perimeter of the treatment zone.

8. General: A confirmation sampling plan has not been included for the soil associated with the degreaser pit area. The confirmation sampling plan submitted for U.S. EPA approval should include samples collected from this area.

Figure 6.0-1

1. Confirmation samples are not proposed under the Lockformer building. Figure 6.0-1 should be revised to include samples collected under the building.

2. Although the sampling plan is conceptual, unique identifiers should be assigned to each boring location.

GENERAL COMMENTS

1. During installation of the various treatment systems and investigation of soil at the site, numerous borings will be advanced. All borings should be appropriately abandoned such that subsurface conduits are not created. References to a boring abandonment SOP should be added to the document. In addition, during drilling activities at the site, there is potential to encounter free product. Any free product that is encountered should be reported to U.S. EPA and efforts immediately initiated to recover the product.

2. The design of the remedial systems is largely conceptual in nature, as design specifications and technical drawings were not submitted. It is unclear at this time whether these will be provided for review prior to system installation.

3. Methods for removal and/or abandonment of the treatment systems and their components should be presented in the LWP.

4. A contingency plan should be prepared to address issues associated with electrocution, vapor releases, etc.

APPENDIX A

The following are technical review comments for Standard Operating Procedures (SOPs) contained in Volume II (Appendix A) of Clayton Group Services, Inc. document titled "Lockformer Work Plan" dated 13 December 2001. Technical review was limited to the following SOPs:

- SOP 110 – Records, Reports, Field Reporting, Documentation, and Record Retention.
- SOP 120 – Borehole Logging and Material Classification.
- SOP 200 – Soil Sampling and Rock Sampling.
- SOP 211 – Grouting Procedures.
- SOP 310 – Air Quality Monitoring.
- SOP 320 – Field Measurements.
- SOP 330 – Vapor Head space Screening.
- SOP 500 – Equipment Decontamination.
- SOP 910 – Sample Containers, Preservation, and Holding Times.
- SOP 911 – Sample Classification, Storage, Packaging, and Shipment.
- SOP 912 – Sample Control and Custody Procedures.
- SOP 920 – Field Quality Assurance Samples.
- SOP 930 – Control, Calibration, and Maintenance of Measurement and Test Equipment.

Other SOPs included in Appendix A were not reviewed at this time; however, review of these SOPs can be performed at the request of U.S. EPA. General and specific technical review comments for each SOP reviewed are provided below.

General Comments

1. The FSP for this project indicates that soil borings will be performed using direct-push technology. This boring and sampling technique is not addressed in any of the provided SOPs. An SOP should be prepared to detail the methods and procedures whereby soil borings will be advanced and soil and groundwater samples may be collected using direct-push equipment.

2. The FSP indicates that Method 5035 will be utilized for soil sampling; however, it is unclear whether Encore samplers will be utilized or field methanol preservation will be performed. In either case, the SOPs do not adequately address these sampling protocols.

SOP No. 110

1. 2.2.5 Visitor's Log, Part A: WESTON recommends that authorized visitors entering the work zone have appropriate personal protective equipment (PPE), as necessary, such as a hard hat, steel-toe shoes, etc., to be specified in a U.S. EPA approved HASP.

SOP No. 120

1. 2.2 Logging Equipment and Supplies, Soil Sampling and Logging Equipment and Supplies: Other equipment recommended for use would be:

    - Hand penetrometer.
    - Appropriate environmental monitoring equipment, such as a photo ionization device (PID), as specified in the HASP.

2. 2.3 Logging and Documentation, Part A: Other recommended information would be:

    - USCS classification.
    - Sample blows (per foot).
    - PID reading (ppm).
    - Soil sample information (number, type, depth, recovery).

3. 2.3 Logging and Documentation, Part B: Other recommended information would be:

    - Type of core (NX, BX, AQ, etc.).
    - Rock quality designation (RQD).

4. 2.4.1 Description of Hierarchy: Other recommended information would include odor.

5. Attachment 2, Field Classification of Soils, Consistency of Cohesive Soils: WESTON recommends that the "hard" consistency should be denoted as >30 blows per foot.

6. Attachment 3, Relative Density of Cohesion less Soils, Relative Density of Cohesionless Soils: WESTON recommends that the "very dense" should be denoted as >50 blows per foot.

SOP No. 200

1. 2.1 General Requirements, B, 3: Overhead utilities should also be located along with other utilities.

2. 2.2.2 Split-Spoon Sampler, E: WESTON recommends that the liner tubes be correctly labeled with the following information:

   - Depth.
   - Date.
   - Sample number.
   - Project number.
   - Top and bottom.
   - Boring number.

   In addition, this SOP does not specify procedures for cases in which an Encore sampler will be used to collect VOC fraction soil samples. The FSP for this project indicates samples will be collected using Method 5035; however, it is unclear whether Encore samplers will be used or methanol preservation will be conducted in the field. In either case, the SOPs do not address these considerations.

3. 2.2.4 Thin-Walled (Shelby) Tube Samplers, C, 2: WESTON recommends that the sample tube be labeled with the following information:

   - Top and bottom.
   - Boring number.
   - Project number.
   - Sample number.
   - Depth.
   - Date.

   WESTON also recommends that the sample tube be handled properly during transportation (kept upright, no jarring of sample). Also, correctly pack the tube with material for shipping (ends capped and taped).

4. 2.2.4 Thin-Walled (Shelby) Tube Samplers, G: The SOP should define what comprises "standard practices for geotechnical investigations."

5. 2.2.5 Cuttings or Wash Samples: This is not a recommended method for sampling or logging of soil. It is not very accurate or precise, and should only be considered when other sampling methods fail or are not possible.

6. 2.2.5 Cuttings or Wash Samples, B: If this method is used to log soils, note as such on the boring log.

7. 2.2.6 Test Pit Excavation and Sampling, F: Date and location should also be recorded in the field logbook.

8. Attachment 1, Material Sampling Form: WESTON recommends that PID readings (ppm) should also be noted on the form, if taken.

SOP No. 330

1. 2.3 Equipment and Materials (ID or PID with calibration kit): Should ID actually be FID? Please revise as appropriate.

SOP No. 500

1. 2.2.1 Site Selection, B: It is not recommended that decontamination fluids be discarded or discharged into existing pits or lagoons at this site. The recommended strategy would be to store decontamination fluids in storage containers, such as 55-gallon drums or water tanks, followed by characterization, and proper disposal.

2. 2.4 Sampling Equipment Decontamination Procedures, F: This is not a recommended procedure, especially for delicate equipment, such as water quality meters. Excessive force and pressure caused by this procedure could damage the equipment.

3. 2.6.3 Offsite Disposal, A: Ensure that storage containers are properly sealed and labeled, as required.

SOP No. 910

1. 2.1 General Requirements, B: Is this correct? SOP 930 describes control, calibration, and maintenance of test equipment. Please clarify.

2. 2.1 General Requirements, J: This is not recommended. Some tapes may contain certain chemicals that could contaminate the sample.

3. 2.3.1 Water Samples, Organics, B: Trip blanks should be preserved with hydrochloric acid (HCl).

SOP No. 911

1. 2.1 General Requirements, D: SOP 930 talks about control, calibration, and maintenance of equipment. Is this correct here? Please clarify.

2. 2.3.4 Glass Containers: It is not recommended that container lids always be taped, as some tapes contain chemicals that could contaminate the sample. Also, it is not recommended that vermiculite be used as a packing material, as some vermiculite contains asbestos. Alternative packing materials (i.e., bubble wrap, cardboard, or shredded paper) are recommended.

3. 2.3.5 Plastic Containers: Caps should not be taped, as some tapes contain chemicals that could contaminate the sample.

4. 2.4.2 Shipping Containers for Unanalyzed Waste Excluding Closed Container Samples, B: Vermiculite is not recommended as a packing material, as some vermiculite contains asbestos. Alternative packaging materials (i.e., bubble wrap, cardboard, or shredded paper) are recommended.

SOP No. 920

1. 2.2.2 Replicate Preparation and Sampling, A & B: WESTON recommends that replicates for soil be taken by putting the soil core(s) in a clean stainless-steel mixing bowl and homogenizing the sample media by mixing thoroughly with a decontaminated or dedicated and disposable implement until its appearance is consistent. The investigative and duplicate samples should then be collected by alternately filling the containers from the homogenized sample media. This protocol ensures that the sample media is homogenous and that the investigative and replicate samples more closely resemble each other. The exception would be for volatile samples, where sample contact with air should be minimized. Additionally, this SOP does not provide for the case in which samples would be collected using Encore samplers under Method 5035, which is indicated in the FSP.

2. 2.2.2 Replicate Preparation and Sampling, E: WESTON recommends that duplicate samples be taken at a frequency of one per 10 samples per matrix, and a minimum of one duplicate sample be collected for each analytical batch.

Should you have any questions or require additional information, please feel free to contact me at (847) 918-4000.

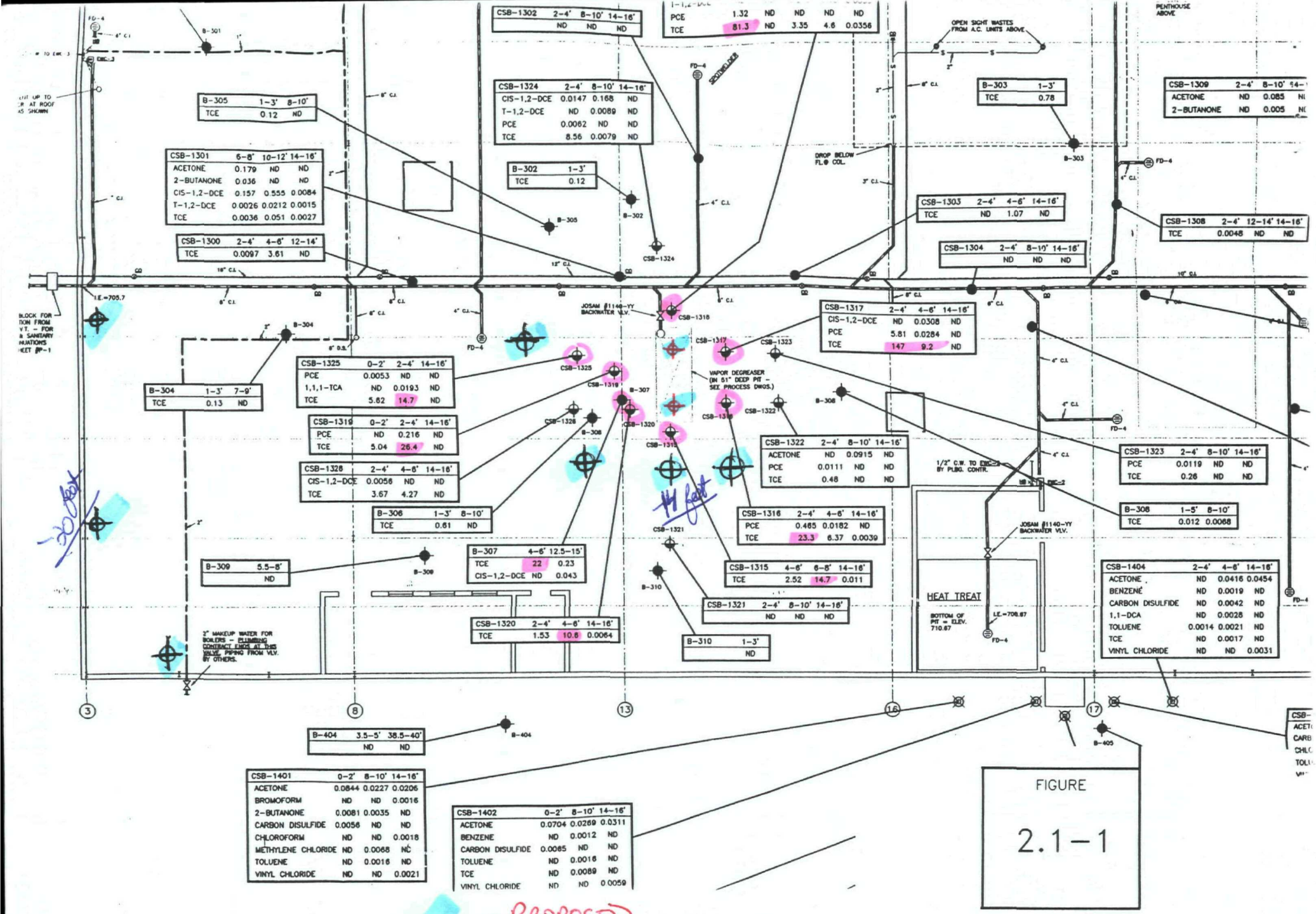
Very Truly Yours,

ROY F. WESTON, INC.

for Omprakash S. Patel
Senior Project Manager

ATTACHMENT A

ADDITIONAL SAMPLING MAPS

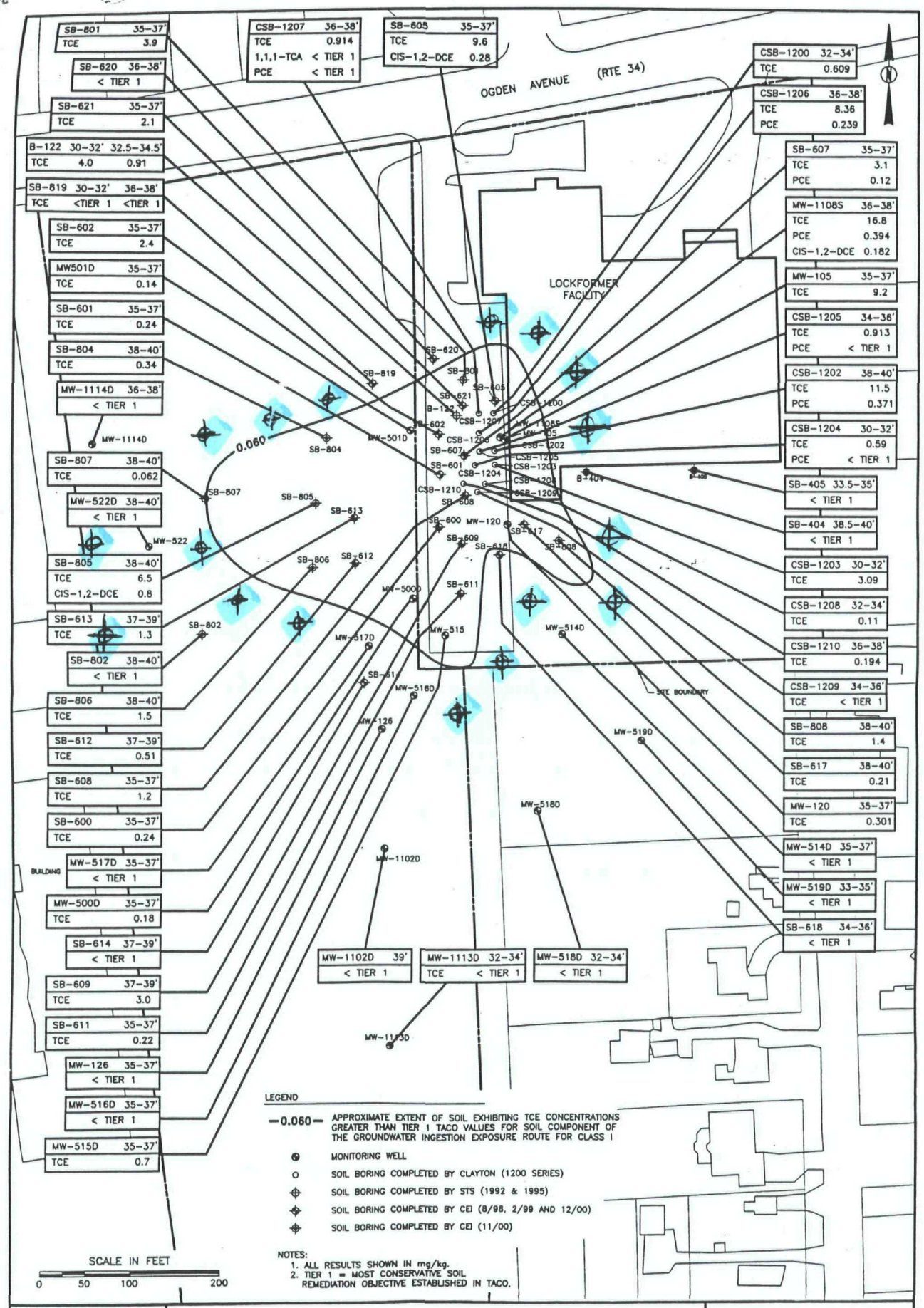


FIGURE

2.1-1

— PROPOSED

— > 8.9 mg/kg



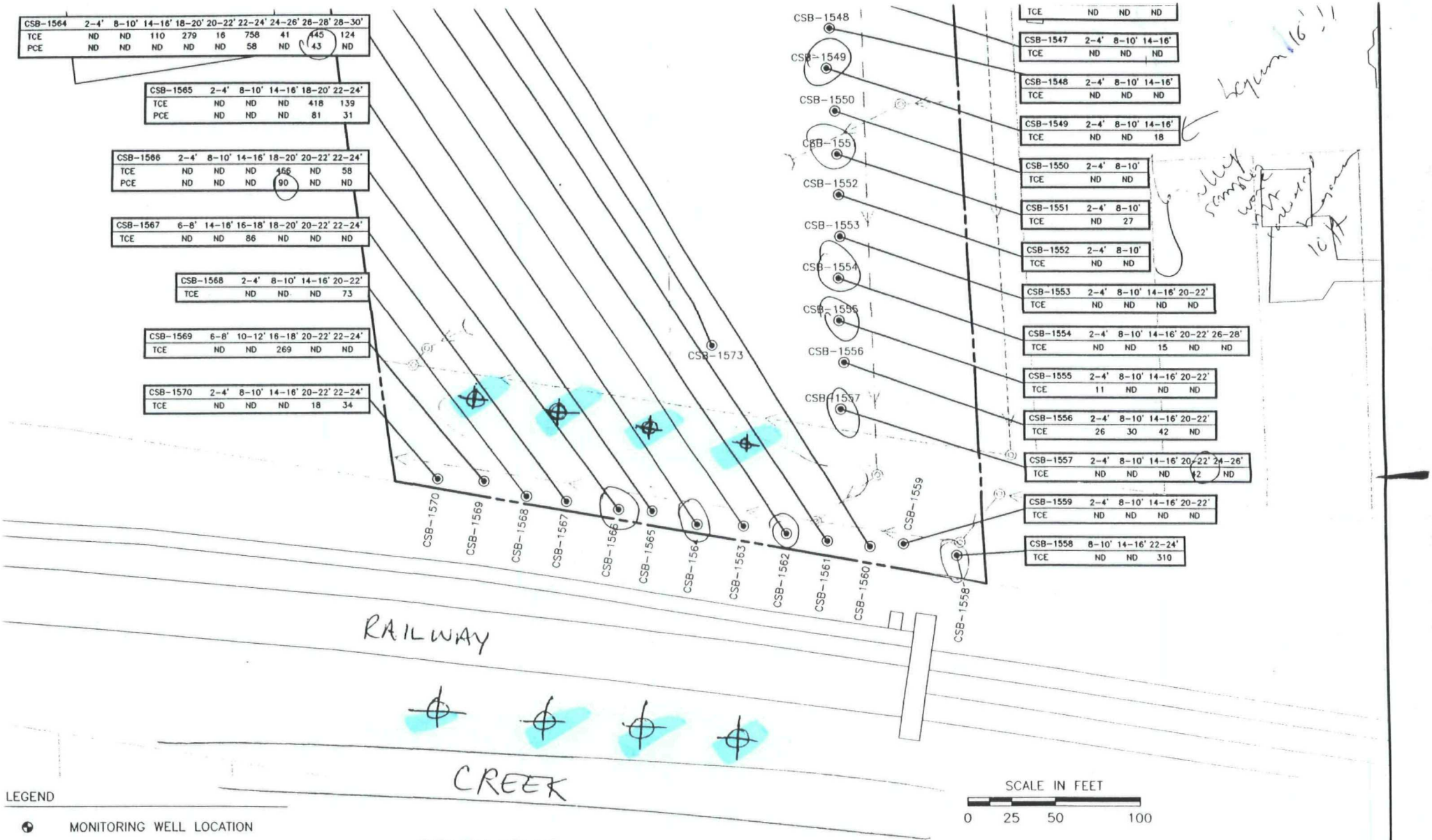
CHECK BY	
DRAWN BY	BCP
DATE	12-12-01
SCALE	AS SHOWN
CAD NO.	6526307F1
PRJ NO.	55263.01

SOIL SAMPLES IN THE 30-40' DEPTH INTERVAL

LOCKFORMER COMPANY
711 W. OGDEN AVENUE
LISLE, ILLINOIS

Clayton GROUP SERVICES

FIGURE 2.1-5F



LEGEND

- MONITORING WELL LOCATION
- SOIL BORING LOCATION
- SANITARY SEWER LINE
- STORM SEWER LINE

FIRST ENV. LAB, INC.
(FIXED LAB RESULTS)

FIELD GC

NOTE: ALL RESULTS SHOWN IN mg/kg.

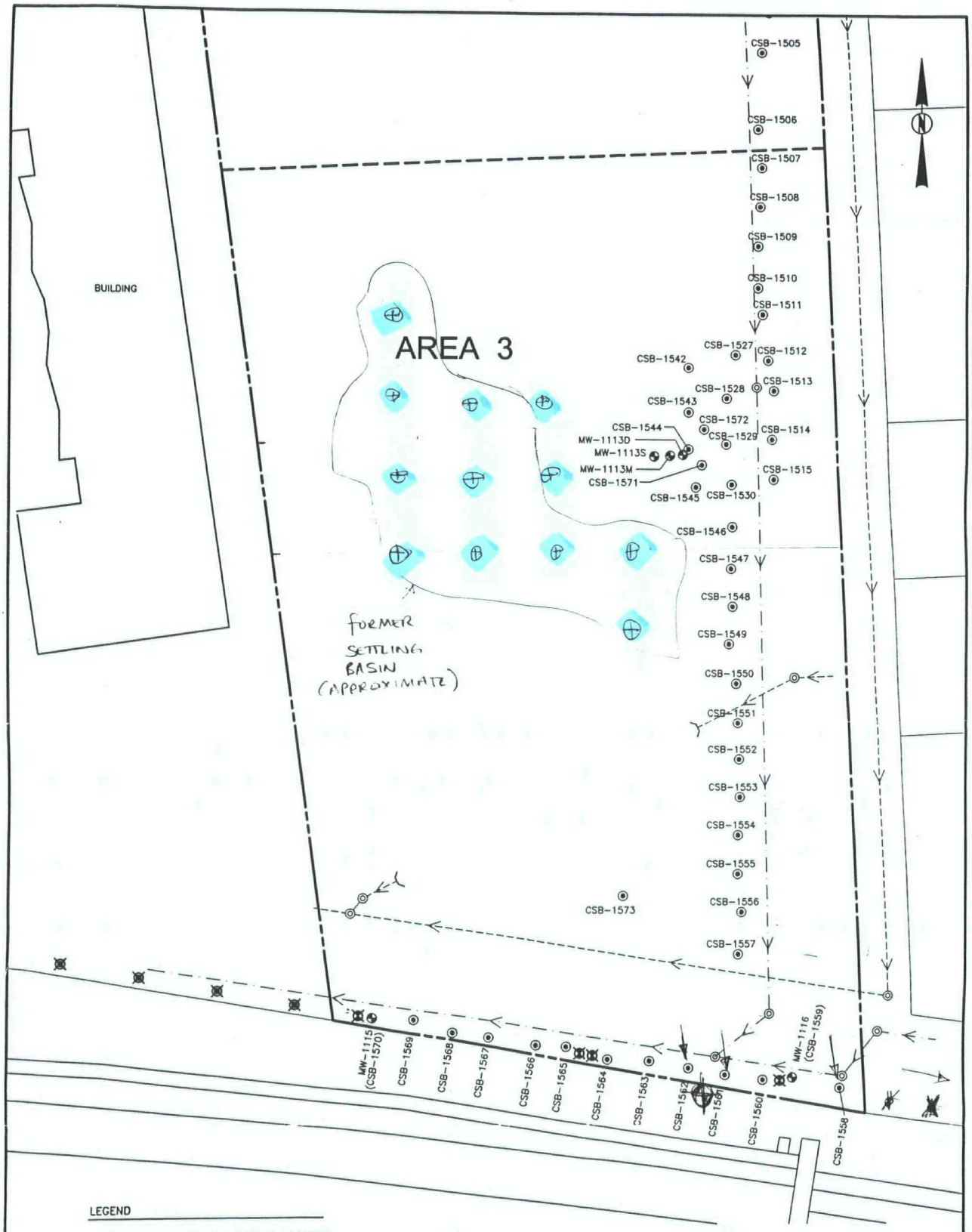
CHECK BY	
DRAWN BY	BCP
DATE	12-12-01
SCALE	AS SHOWN
CAD NO.	6526303E
PRJ NO.	65263.01

SUMMARY OF RESULTS FROM THE
1500-SERIES BORINGS IN AREA 3

THE LOCKFORMER COMPANY
711 W. OGDEN AVENUE
LISLE, ILLINOIS

Clayton GROUP SERVICES

FIGURE 2.2-1



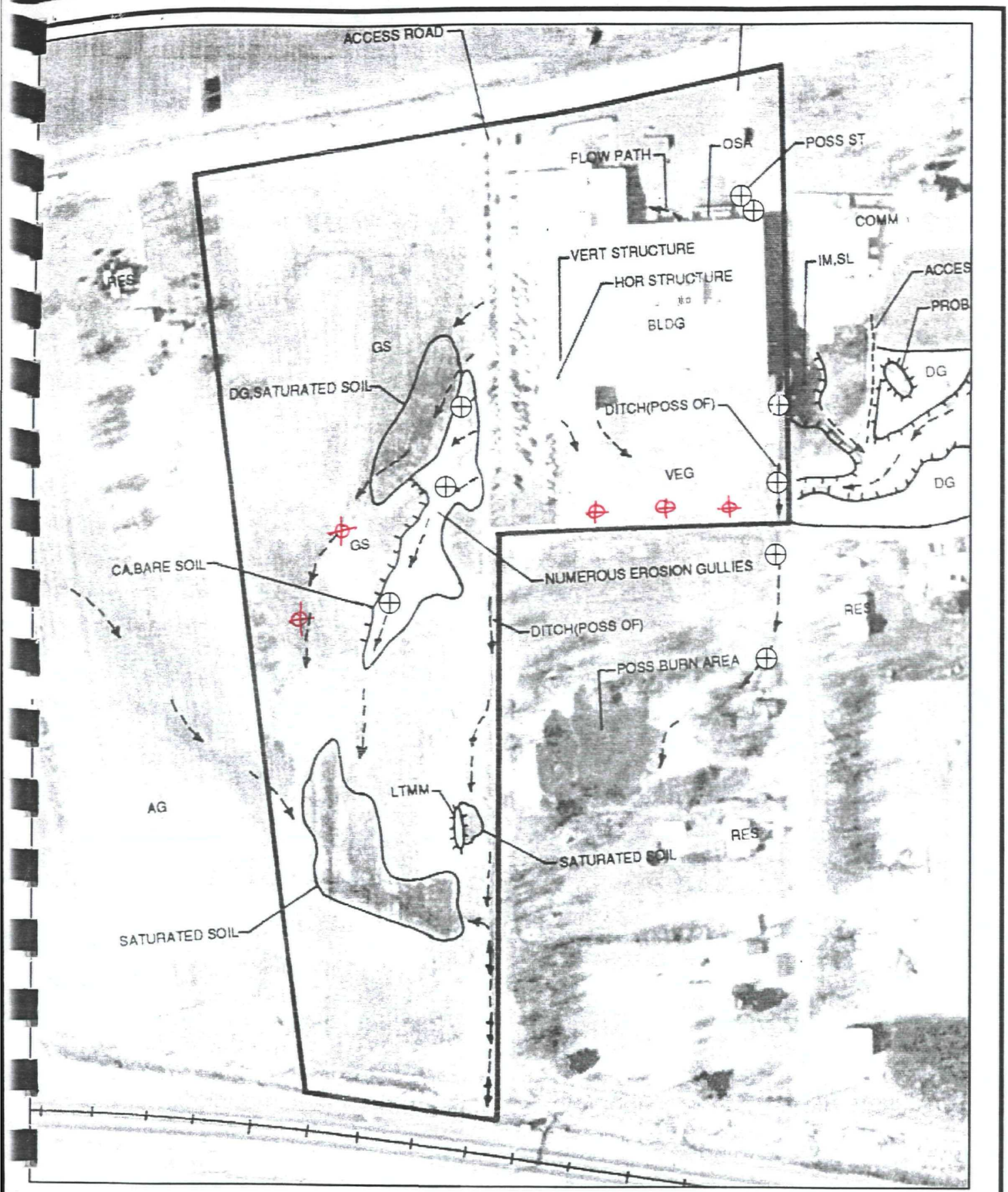
CHECK BY	
DRAWN BY	BCP
DATE	12-12-01
SCALE	AS SHOWN
CAD NO.	6526303H
PRJ NO.	65263.01

AREA 3 LAYOUT MAP

THE LOCKFORMER COMPANY
711 W. OGDEN AVENUE
LISLE, ILLINOIS

Clayton GROUP SERVICES

FIGURE 4.3-1



SURFACE DRAINAGE WAY SAMPLING MAP
THE LOCKFORMER COMPANY / LISLE, ILLINOIS

Map Base: EPA Report - TS-PIC-20105579S
Figure 4, Base Aerial Photograph - April 9, 1970

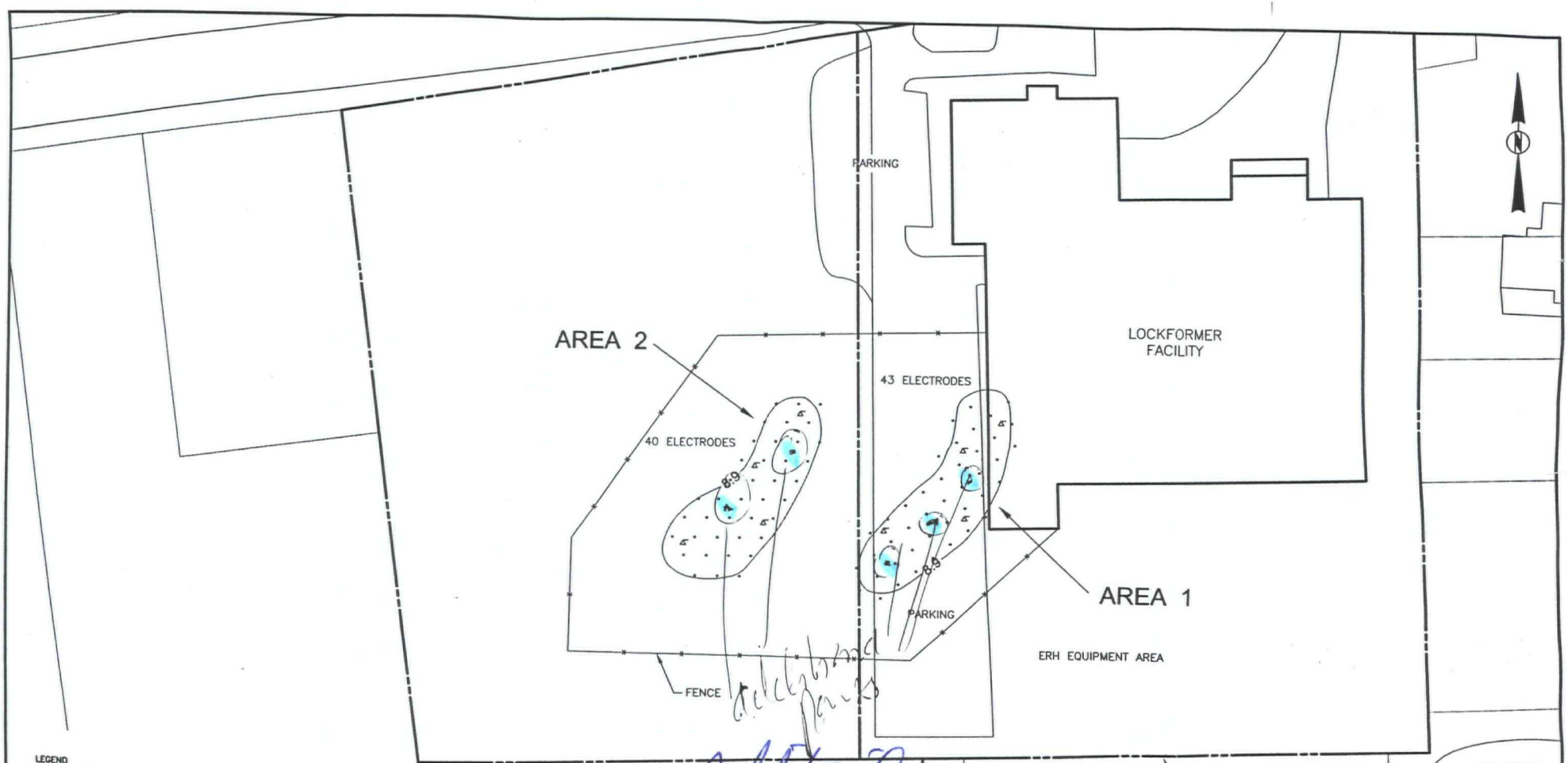
Legend
⊕ PROPROSED BORING LOCATION

0 100 200 300 400 Feet

Project: 15-65263.01
SUR_DRAIN_SAM.MXD
Date: 12/11/01
Drawn By SFS

Clayton GROUP SERVICES

FIGURE 4.4-1



Additional Temperature Probes

LEGEND

—8.9— TCE ISOCONCENTRATION LINES FROM UPPER COHESIVE TILL.

• ELECTRODE LOCATION

TEMPERATURE MONITORING PROBE

SCALE IN FEET

0 40 80 160

CHECK BY	JLP
DRAWN BY	BCP/OS
DATE	12-12-01
SCALE	AS SHOWN
CAD NO.	6526303A1
PRJ NO.	15-65263

PRELIMINARY LOCATIONS OF ELECTRODES AND MONITORING PROBES FOR THE ERH SYSTEM

LOCKFORMER COMPANY
711 W. OGDEN AVENUE
LISLE, ILLINOIS

Clayton GROUP SERVICES

FIGURE 5.1-1